

# Unilateral Variant of NGT Syndrome: An Uncommon Complication of a Very Common Intervention

Gerontology & Geriatric Medicine  
Volume 9: 1–5  
© The Author(s) 2023  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/23337214231172626  
journals.sagepub.com/home/ggm



Theresa Paul, CABMS, MRCP<sup>1</sup> , Reham Kama Abo Shdid, CABMS<sup>1</sup>, and Shafi Hashmath Ulla Khan, MBBS, MRCP, DGM<sup>2</sup>

## Abstract

The common complications of nasogastric tube placement include gastrointestinal—tube malposition, coiling, or knotting, impaired function of the lower esophageal sphincter leading to reflux of gastric contents, esophagitis, gastrointestinal bleeding, and aspiration pneumonia. Sofferman et al. in 1990, described a clinical entity constituted by life-threatening bilateral vocal cord paralysis, presenting as throat pain, stridor and respiratory compromise as Nasogastric syndrome (NGTS). There are fewer than 50 cases of NGTS described in the literature, till date, let alone a unilateral variant of the same. Here we have described two cases of unilateral variant of NGTS, the management, outcome, and a detailed literature review of the previous reported cases. The two cases described were identified in the same year, highlighting the fact that, the entity might be more common, and needs more clinical attention than previously estimated.

## Keywords

dependence, diet and nutrition, long-term care, multimorbidity

**Manuscript received:** March 21, 2023; **final revision received:** March 23, 2023; **accepted:** April 11, 2023.

## Introduction

Nasogastric tube insertion is a universal procedure with several indications. From its initial description in 1790, by Hunter, nasogastric tubes are now used for stomach decompression in the setting of intestinal obstruction or ileus, and also to administer nutrition or medication to patients who are unable to tolerate oral intake (Sigmon & An, 2022). The commonly recognized complications of nasogastric tube placement include gastrointestinal—tube malposition, coiling, or knotting occurring anywhere from its origin to duodenum (Agarwala et al., 1998), impaired function of the lower esophageal sphincter leading to reflux of gastric contents, esophagitis, gastrointestinal bleeding, and aspiration pneumonia (Newton et al., 2000). Common pulmonary complications include nasal alar ulceration or necrosis, congestion and rhinosinusitis (Lai et al., 2001; Stein & Caplan, 2005). Rarely, they are known to cause potential perforation of pulmonary structures or the gastrointestinal tract as well. Nasogastric tube syndrome is a much less commonly recognized complication. The term was coined as recognized as a clinical entity by Dr. Sofferman et al. in 1990, its is characterized by life-threatening bilateral vocal cord paralysis, presenting as throat pain, stridor and respiratory compromise (Sofferman et al.,

1990). Here we describe two cases of NGT syndrome, but a unilateral variant managed conservatively.

## Case I

Seventy-eight year old lady, with history of multiple comorbidities, including, Diabetes type II, hypertension, dyslipidemia and dementia of Alzheimer's type with psychosis and depression since 2007. She also had history of osteoporosis and history of fall and Right hip fracture and underwent hemiarthroplasty. After the arthroplasty patient had a complicated hospital course and multiple episodes of hypoactive delirium, spanning over 3 months (August 2021 to November 2021), resulting in a steady decline in functional status. Once she was clinically stable, she was admitted to our long-term specialized care center for supportive care. She was fully

<sup>1</sup>Clinical Fellow, Geriatrics, Rumailah Hospital, Hamad Medical Corporation, Doha, Qatar

<sup>2</sup>Senior Consultant, Geriatrics, Rumailah Hospital, Hamad Medical Corporation, Doha, Qatar

### Corresponding Author:

Theresa Paul, Clinical Fellow, Department of Geriatrics, Hamad Medical Corporation, Hamad Medical City, Doha 3050, Qatar.  
Email: theresaleenespaul@gmail.com



dependent on all activities of daily living from admission, was on diapers and NGT for feeds. NGT was first inserted on September 2021. Four months after admission to our facility, rapid responses were activated for desaturation and noisy breathing, on 31/03/2022. The last change of NGT prior to the event was on 7th March 2022. On examination, patient was in significant respiratory distress, tachycardic (HR 110–120), Tachypneic, (RR 20–24), and desaturating, with stridor. There was no new focal neurological deficits on examination. Stat nebulization with salbutamol, budesonide, ipratropium and hydrocortisone 50 mg IV was given and she was urgently transferred to A&E. In the A&E, during initial assessment, audible stridor was heard, chest examination obscured by transmitted sounds from the upper airway but air entry was present equally.

ENT was contacted to assess the patient through fiberoptic, which revealed right vocal cord palsy and mobile left vocal cord with compensation and patent airway. Anesthesia was contacted to stay stand by for ETT insertion or tracheostomy, with workup for underlying infection possibly precipitating the paralysis was started. ECG: NSR, no sign of acute ischemia and Chest XR: right lower lobe consolidation.

ENT assessment was URTI complicated with right vocal cord palsy. She was started on IV steroids, PPI and regular nebulization with salbutamol. She was also started with Piperacillin Tazobactam for aspiration pneumonia, considering the chest XR infiltrates. Two days later, stridor was well settled, and patient improved clinically. She was transferred back to the long term care unit on the third day.

## Case 2

Seventy-nine year old lady, with background of Alzheimer's dementia and depression, Type-2 Diabetes mellitus and Coronary artery disease. She was admitted in our specialized care center following deterioration of general condition after multiple episodes of urinary tract infections, and cellulitis of the legs. Functionally, she was bed bound with contracted knees and double incontinent and dependent on all ADL's. She was on NGT feeding for inadequate oral feeds and aspiration risk initially on 07/06/2020, with regular changes every 6 weeks. The last NGT change prior to the even was on 10/04/2022. On 04/05/2022, she was noted with noisy breathing, with stridor, however, her saturation was maintained. She was started on regular nebulization with budesonide and inflammatory markers, sepsis screen and viral panel was requested. She was started empirically on Piperacillin Tazobactam underlying infection as initial inflammatory markers were high.

ENT was consulted, who assessed the patient with fiberoptic study, which showed right vocal cord paralysis and normally mobile left vocal cord with good glottic space for breathing. There was good compensation in

adduction position. Edema of the arytenoid and interarytenoid area was also noticed. She was advised to be kept on PPI, nebulizations and to be started on Dexamethasone 8 mg IV q8hrs, with close observation for any further deterioration.

The stridor gradually improved, and was completely resolved on day 6 and steroid was stopped. She continued to receive 7 days of antibiotics, as urine cultures were positive for *Klebsiella pneumoniae*.

## Discussion

Nasogastric tube syndrome the term used to describe a triad of nasogastric intubation, throat pain and vocal cord paralysis, usually bilateral (Sofferman et al., 1990) was first coined by Dr. Sofferman and published in 1990. There are fewer than 50 cases reported in literature, with the initial reports of laryngeal injury by nasogastric intubation in 1939 by Wangenstein et al., followed by Iglauer and Molt with a review of 10 cases in the same year (Iglauer & Molt, 1939; Wangenstein et al., 1939). The clinical presentation draws attention to a medical emergency as bilateral vocal cord paralysis results in airway compromise. The pathogenesis involves paresis of the posterior cricoarytenoid muscles secondary to ulceration and infection over the posterior lamina of the cricoid (Sofferman et al., 1990). Sofferman and Hubbell proposed the three mechanisms for the development of the clinical entity, the first is the dynamic nature of the larynx, sliding up and down against a semi-rigid NG tube as the patient coughs and swallows. The second mechanism is the normal tonic contractile state of the cricopharyngeus muscle pressing the tube against the posterior cricoid cartilage lamina. Finally, in the supine patient, gravity pulls the larynx posteriorly, pinching the NG tube between the two rigid structures of the cricoid cartilage and anterior cervical spine. All three mechanisms result in pressure against the posterior cricoid lamina, leading to trauma and ischemic necrosis ending in infection of the mucosa, posterior cricoarytenoid muscle, and cartilage (Sofferman & Hubbell, 1981). Later on, another possibility due to compression of the vessels supplying the posterior cricoarytenoid muscle by the NGT was also considered (Isozaki et al., 2005).

The varied time of presentation and lack of predictability in presentation possess great challenge to diagnosing the condition. Symptoms are often misinterpreted or attributed to more common diagnostic possibilities like infection or asthma. Review of previous case reports highlight pain as the important early symptom (Vielva del Campo et al., 2010), which is difficult to be assessed for in bedbound patients, who are cognitively impaired.

Therefore, NGT syndrome should always be considered in patients with NGT inserted, presenting with stridor or dyspnea. The use of an appropriate size and type of NGT according to the patient's condition is very

important to prevent the development of NGT Syndrome. The western guidelines for enteral nutrition recommend using a soft, flexible, small size nasogastric tube (12 French or less) for long-term enteral feeding (Kanbayashi et al., 2021). In both our cases nasogastric tube syndrome developed despite the use of a smaller-sized feeding tubes, the nasogastric tube size was 12 Fr. Hence, the type of Nasogastric tube might also be a factor in development of nasogastric tube Syndrome. A soft flexible one is preferred to the rigid tube (Kanbayashi et al., 2021).

Ideally, patients suspected with nasogastric tube syndrome should be fully evaluated to look for causes of vocal cord paralysis, including naso-laryngoscopy and CT neck. In both of our patients, CT neck was deferred considering the clinical response to treatment, unilateral form of paralysis and poor functional status.

Management of nasogastric tube syndrome is targeted at reducing the inflammation and preventing further complications such as abscess formation. The key treatment of NTS is removal of the nasogastric tube or long intestinal tube as it can lead to rapid resolution of respiratory distress. If a patient suffering from NTS requires prolonged duration of nasogastric tube, a percutaneous gastrostomy is an option (Sano et al., 2016). Both our patients showed clinical response in the initial few days, and were functionally poor, percutaneous gastrostomy placement was not considered. It is vital that patients with suspected nasogastric tube syndrome be closely monitored for desaturation and necessary steps taken for emergent intervention for airway compromise.

Tracheotomy is preferable to prolonged endotracheal intubation because the latter can delay the recovery of vocal cord function for several months. With regard to other treatments, parenteral corticosteroids should be

used to reduce inflammation, and antibiotics should be used to prevent the formation of retro-cricoid abscesses. Moreover, the patient should refrain from oral ingestion for several days, with daily inspection of the larynx to detect reduction in arytenoid edema. If necessary, intravenous fluids, hyperalimentation, or gastrostomy could be required during this interval (Sano et al., 2016)

There have been cases that improved only with the removal of the tube. However, when removal of the tube does not improve symptoms, tracheotomy will be required.

Review of literature highlights the fact that more than 50% of the patients required tracheostomy due to delayed recovery and nasogastric tube was removed with alternate form of enteral feed sought (Table 1).

## Conclusion

Considering the extensive use of nasogastric tubes in hospital practice and the challenges in diagnosing, nasogastric tube syndrome deserves serious attention by clinicians. An early recognition of the symptoms can help in preventing acute upper airway obstruction and the need of tracheostomy. The two cases here described a less severe form of the syndrome, with unilateral vocal cord paralysis. The active management depends on the severity, with tracheotomy in severe cases with airway compromise to antibiotics and parenteral steroids. If suspected patients should be very closely monitored for desaturation and necessary steps taken for emergent intervention for airway compromise. For long-term placement, the use of rigid nasogastric tubes should be discouraged and either a soft flexible nasogastric tube of small size or a temporary percutaneous gastrostomy should be considered in such patients.

**Table 1.** Table Case Reports of Nasogastric Tube Syndrome.

Author	Year	Age (years), Gender	Tube	Unilateral/Bilateral Vocal cord involvement	Treatment	Outcome
Sofferman et al. (1990)	1990	28, Male	NGT	Bilateral	Removal of NGT, tracheotomy	Full recover
Sofferman et al. (1990)	1990	42, Male	NGT	Unilateral	Removal of NGT, tracheotomy	Full recover
Sofferman et al. (1990)	1990	36, Male	NGT	post-cricoid edema.	Removal of NGT, tracheotomy	Death
Sofferman et al. (1990)	1990	45, Female	NGT	Bilateral	Removal of NGT, tracheotomy	Full recover
Apostolakis et al. (2001)	2001	77, Male	NGT	Bilateral	Removal of NGT, tracheotomy	Not recover
Apostolakis et al. (2001)	2001	73, Male	NGT	Bilateral	Removal of NGT, tracheotomy	Full recover
Leclerc et al. (2002)	2002	71, Female	NGT	Bilateral	Tracheotomy	Not recover (cricoid necrosis)
Nehru et al. (2003)	2003	60, Male	NGT	Unilateral	Removal of NGT, tracheotomy	Full recover
Sanaka et al. (2004)	2004	85, Male	long intestinal tube	Bilateral	Removal of long intestinal tube, tracheotomy	Full recover
Isozaki et al. (2005)	2005	73, Male	NGT	Bilateral	None	Death
Isozaki et al. (2005)	2005	77, Female	NGT	Bilateral	Removal of NGT	Death
Isozaki et al. (2005)	2005	79, Female	NGT	Bilateral	Undescribed	Undescribed
Isozaki et al. (2005)	2005	72, Female	NGT	Bilateral	Undescribed	Undescribed
Marcus et al. (2006)	2006	72, Male	NGT	Bilateral	Removal of NGT, tracheotomy	Full recover
Vielva del Campo et al. (2010)	2010	70, Female	NGT	Bilateral	Removal of NGT, tracheotomy	Full recover
Ohshima et al. (2010)	2010	62, Female	NGT	Bilateral	Removal of NGT	Full recover
Harmon et al. (2014)	2014	2 months Male	NGT	post-cricoid edema.	Removal of NGT	Full recover
Harmon et al. (2014)	2014	3 months, Female	NGT	post-cricoid edema.	Removal of NGT	Full recover
Harmon et al. (2014)	2014	3 months, Male	NGT	post-cricoid edema.	Removal of NGT	Full recover
Sano et al. (2016)	2015	76, male	Long intestinal tube	Bilateral	Removal of NGT, tracheotomy	Full recover
Kanbayashi et al. (2021)	2021	77 year, Male	NGT	Bilateral	Removal of NGT	Full recover
Our case 1	2022	79 year, Female	NGT	Unilateral	Medical management	Full recover
Our case 2	2022	78 year Female	NGT	Unilateral	Medical Management	Full recover

## Acknowledgments

We acknowledge the leaders and staff of geriatric acute and long-term care in Rumailah Hospital for all their hard work and dedication

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

Theresa Paul  <https://orcid.org/0000-0002-9290-0270>

## References

- Agarwala, S., Dave, S., Gupta, A. K., & Mitra, D. K. (1998). Duodeno-renal fistula due to a nasogastric tube in a neonate. *Pediatric Surgery International*, *14*(1-2), 102–103. <https://doi.org/10.1007/s003830050451>
- Apostolakis, L. W., Funk, G. F., Urdaneta, L. F., McCulloch, T. M., & Jeyapalan, M. M. (2001). The nasogastric tube syndrome: Two case reports and review of the literature. *Head & Neck*, *23*(1), 59–63. [https://doi.org/10.1002/1097-0347\(200101\)23:1<59::aid-hed9>3.0.co;2-a](https://doi.org/10.1002/1097-0347(200101)23:1<59::aid-hed9>3.0.co;2-a)
- Harmon, J., Balakrishnan, K., de Alarcon, A., & Hart, C. K. (2014). The nasogastric tube syndrome in infants. *International Journal of Pediatric Otorhinolaryngology*, *78*(5), 882–884. <https://doi.org/10.1016/j.ijporl.2014.02.013>
- Iglauer, S., & Molt, W. F. (1939). LXXI severe injury to the larynx resulting from the indwelling duodenal tube (case reports). *Annals of Otology Rhinology & Laryngology*, *48*(4), 886–904. <https://doi.org/10.1177/000348943904800402>
- Isozaki, E., Tobisawa, S., Naito, R., Mizutani, T., & Hayashi, H. (2005). A variant form of nasogastric tube syndrome. *Internal Medicine*, *44*(12), 1286–1290. <https://doi.org/10.2169/internalmedicine.44.1286>
- Kanbayashi, T., Tanaka, S., Uchida, Y., Hatanaka, Y., & Sonoo, M. (2021). Nasogastric Tube Syndrome: The size and type of the nasogastric tube may contribute to the development of Nasogastric Tube Syndrome. *Internal Medicine*, *60*(12), 1977–1979. <https://doi.org/10.2169/internalmedicine.6258-20>
- Lai, P. B., Pang, P. C., Chan, S. K., & Lau, W. Y. (2001). Necrosis of the nasal ala after improper taping of a nasogastric tube. *International Journal of Clinical Practice*, *55*(2), 145.
- Leclerc, C., Perhirin, M., De Rugy, M. G., & Valdazo, A. (2002). Lésion sévère du larynx provoquée par une sonde nasogastrique [Severe laryngeal injury due to a nasogastric tube]. *Annales Francaises d'Anesthesie et de Reanimation*, *21*(4), 306–309. [https://doi.org/10.1016/s0750-7658\(02\)00608-1](https://doi.org/10.1016/s0750-7658(02)00608-1)
- Marcus, E. L., Caine, Y., Hamdan, K., & Gross, M. (2006). Nasogastric tube syndrome: A life-threatening laryngeal obstruction in a 72-year-old patient. *Age and Ageing*, *35*(5), 538–539. <https://doi.org/10.1093/ageing/af1042>
- Nehru, V. I., Al Shammari, H. J., & Jaffer, A. M. (2003). Nasogastric tube syndrome: The unilateral variant. *Medical Principles and Practice*, *12*(1), 44–46. <https://doi.org/10.1159/000068162>
- Newton, M., Burnham, W. R., & Kamm, M. A. (2000). Morbidity, mortality, and risk factors for esophagitis in hospital inpatients. *Journal of Clinical Gastroenterology*, *30*(3), 264–269. <https://doi.org/10.1097/00004836-200004000-00012>
- Ohshima, M., Hori, E., Suzuki, A., Katoh, H., Itagaki, T., Adachi, Y., Doi, M., & Sato, S. (2010). Nasogastric tube syndrome suspected at the end of anesthesia. *Masui*, *59*(4), 495–497.
- Sanaka, M., Kishida, S., Yoritaka, A., Sasamura, Y., Yamamoto, T., & Kuyama, Y. (2004). Acute upper airway obstruction induced by an indwelling long intestinal tube: Attention to the nasogastric tube syndrome. *Journal of Clinical Gastroenterology*, *38*(10), 913. <https://doi.org/10.1097/00004836-200411000-00020>
- Sano, N., Yamamoto, M., Nagai, K., Yamada, K., & Ohkohchi, N. (2016). Nasogastric tube syndrome induced by an indwelling long intestinal tube. *World Journal of Gastroenterology*, *22*(15), 4057–4061. <https://doi.org/10.3748/wjg.v22.i15.4057>
- Sigmon, D. F., & An, J. (2022). *Nasogastric tube*. StatPearls Publishing.
- Sofferman, R. A., Haisch, C. E., Kirchner, J. A., & Hardin, N. J. (1990). The nasogastric tube syndrome. *The Laryngoscope*, *100*(9), 962–968. <https://doi.org/10.1288/00005537-199009000-00010>
- Sofferman, R. A., & Hubbell, R. N. (1981). Laryngeal complications of nasogastric tubes. *Annals of Otology Rhinology & Laryngology*, *90*(5 Pt 1), 465–468. <https://doi.org/10.1177/000348948109000510>
- Stein, M., & Caplan, E. S. (2005). Nosocomial sinusitis: A unique subset of sinusitis. *Current Opinion in Infectious Diseases*, *18*(2), 147–150. <https://doi.org/10.1097/01.qco.0000160904.56566.4a>
- Vielva del Campo, B., Moráis Pérez, D., & Saldaña Garrido, D. (2010). Nasogastric tube syndrome: A case report. *Acta Otorrinolaringologica Espanola*, *61*(1), 85–86. <https://doi.org/10.1016/j.otorri.2009.03.006>
- Wangensteen, O. H., Rea, C. E., Smith, B. A., & Schwyzer, H. C. (1939). Experiences with employment of suction in the treatment of acute intestinal obstruction. *Surgery, Gynecology & Obstetrics*, *68*, 851–868.